

TABLE 2.—Free-air resultant winds (meters per second) based on pilot balloon observations made near 6 a. m. (E. S. T.) during January 1935

[Wind from N=360°, E=90°, etc.]

Altitude (m) m. s. l.	Albuquerque, N. Mex. (1,554 m)		Atlanta, Ga. (309 m)		Billings, Mont. (1,088 m)		Boston, Mass. (15 m)		Cheyenne, Wyo. (1,873 m)		Chicago, Ill. (192 m)		Cincinnati, Ohio, (153 m)		Detroit, Mich. (204 m)		Fargo, N. Dak. (274 m)		Houston, Tex. (21 m)		Key West, Fla. (11 m)		Medford, Oreg. (410 m)		Murfrees- boro, Tenn. (189 m)			
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity		
Surface....	354	1.1	°	°	240	2.6	305	3.1	282	6.0	294	2.5	310	1.0	242	1.8	313	1.2	41	0.4	26	2.5	142	0.9	°	193	0.3	
500.....	352	3.1	337	3.1	300	7.3	300	7.3	280	4.2	247	3.4	254	5.3	315	3.4	254	1.2	40	3.3	147	1.3	210	2.1	210	2.1	210	2.1
1,000.....	309	3.6	309	3.6	278	6.3	278	6.3	268	8.4	281	6.5	301	3.9	301	3.9	301	3.9	52	1.6	166	4.6	241	3.8	241	3.8	241	3.8
1,500.....	301	6.5	241	8.2	298	10.1	279	7.4	278	9.6	295	8.3	283	7.5	273	9.7	319	3.8	50	0.9	216	6.1	287	7.0	287	7.0	287	7.0
2,000.....	302	2.4	303	7.9	266	8.9	311	12.6	279	7.4	284	11.5	309	8.6	286	12.7	304	5.7	6	1.1	235	9.8	316	8.8	316	8.8	316	8.8
2,500.....	268	4.2	306	8.1	275	12.1	288	12.5	275	12.0	288	13.2	322	11.4	314	12.9	289	17.0	297	5.7	305	2.8	234	10.0	306	11.1	306	11.1
3,000.....	274	7.1	304	9.6	283	12.4	280	10.7	301	15.3	301	15.3	313	14.2	313	14.2	289	17.0	282	6.1	300	4.4	260	9.9	300	11.0	300	11.0
4,000.....	271	9.9	271	9.9	276	12.3	280	11.3	280	11.3	280	11.3	280	11.3	280	11.3	280	11.3	280	11.3	280	11.3	280	11.3	280	11.3	280	11.3
5,000.....	279	8.5	279	8.5	279	8.5	279	8.5	279	8.5	279	8.5	279	8.5	279	8.5	279	8.5	279	8.5	279	8.5	279	8.5	279	8.5	279	8.5

Altitude (m) m. s. l.	Newark, N. J. (14 m)		Oakland, Calif. (8 m)		Oklahoma City, Okla. (402 m)		Omaha, Nebr. (306 m)		Pearl Har- bor, Terri- tory of Ha- waii ¹ (68 m)		Pensacola, Fla. ¹ (24 m)		St. Louis, Mo. (170 m)		Salt Lake City, Utah (1,294 m)		San Diego, Calif. (15 m)		Sault Ste. Marie, Mich. (198 m)		Seattle, Wash. (14 m)		Spokane, Wash. (603 m)		Washing- ton, D. C. (10 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface....	312	2.5	°	°	198	0.8	24	0.9	40	0.2	32	2.3	270	1.4	171	2.0	73	1.1	85	1.2	164	1.9	189	2.4	335	1.9
500.....	315	7.3	114	1.4	194	3.2	264	1.9	224	0.8	35	1.3	271	4.3	194	0.7	194	0.7	299	0.9	190	5.9	318	5.3	318	5.3
1,000.....	313	10.3	241	2.7	244	4.2	274	4.4	224	1.5	282	2.3	300	7.8	229	1.0	229	1.0	288	8.3	188	7.6	206	6.1	307	7.8
1,500.....	317	8.9	240	3.9	255	4.9	270	8.4	223	1.8	286	3.8	297	9.3	168	3.2	199	1.7	311	11.2	197	7.8	221	9.0	293	10.4
2,000.....	317	13.0	235	4.9	272	6.8	298	11.8	222	1.8	253	3.3	298	12.1	184	6.6	205	1.9	200	8.6	237	7.9	291	13.1	291	13.1
2,500.....	249	5.3	283	7.4	295	15.5	241	1.8	302	13.0	310	12.4	310	12.4	213	5.4	239	2.3	210	9.0	247	9.9	298	15.3	298	15.3
3,000.....	260	6.6	286	6.9	299	16.0	281	1.3	310	14.2	310	14.2	310	14.2	246	6.1	258	2.4	219	9.5	246	10.2	246	10.2	246	10.2
4,000.....	234	8.2	283	10.0	300	6.7	283	10.0	283	10.0	283	10.0	283	10.0	251	7.9	253	3.7	253	3.7	253	3.7	253	3.7	253	3.7
5,000.....	234	8.2	283	10.0	300	6.7	283	10.0	283	10.0	283	10.0	283	10.0	251	7.9	253	3.7	253	3.7	253	3.7	253	3.7	253	3.7

¹ Navy stations.

RIVERS AND FLOODS

[River and Flood Division, MONTROSE W. HAYES, in charge]

By RICHMOND T. ZOCH

Although there were numerous floods in the eastern half of the United States in January, as shown in the accompanying flood table, none of those for which complete reports are available caused more than slight damage. Timely warnings were issued for each of these floods.

Complete reports are not available for the floods in the Connecticut River in New England and the Tallahatchie River in Mississippi. The significant features of these floods will be described in a later issue of the MONTHLY WEATHER REVIEW.

Local floods in small streams where the flood warning service is not maintained were reported in the Bull Hook Creek, near Havre, Mont.; in portions of the State of Washington; and near Memphis, Tenn. The official in charge of the Memphis, Tenn., Weather Bureau office comments as follows on the last-mentioned flood:

There are no gages and the Weather Bureau does not furnish a flood-warning service on the following streams of Shelby County, Tenn.: Wolf River, which flows into the Mississippi at Memphis; Loosahatchie River which flows into the Mississippi a few miles north of Memphis; and Nonconah Creek, which flows into the Mississippi on the southern outskirts of Memphis. All of the above streams overflowed their banks on January 20, 1935, and during the night of the 21st reached unprecedented high stages, at least unprecedented for the last 2 decades. The precipitation

at Memphis during the preceding days was 0.59 on January 18, 3.74 on January 19, and 3.74 on January 20, making a total of 8.07 inches in 3 days.

The heavy rainfall was general throughout the Memphis area. A trace of sleet, and 3.2 inches of snow, fell on the 21st. A cold wave occurred on the 21-22, reaching a minimum temperature of 12° on the 22d. The weather continued cold for the next several days, adding to the suffering of livestock, and increasing traffic hazards. All highway traffic into Memphis was halted on the 21st due to washed out roads and bridges, and water on the highways to a considerable depth in places, with the exception of one highway from the east and highways to the west. Several railroads leading into Memphis had to run their trains over other lines for several days until repairs could be made. The Shelby County engineer conservatively estimates the damage to roads and bridges in Shelby County at \$100,000. Owing to the comparatively low stage of the Mississippi River at Memphis on January 21 and the high water in Wolf River, there was a "run-out" on Wolf River on that date. Shortly after noon of the 21st several steamboats, not steamed up, broke from their moorings on Wolf River at the Anderson-Tully Lumber Co. and were carried rapidly downstream by the swift current, crashing and tearing loose other water craft and floating equipment. By the time the runaways reached the Mississippi River there were nearly 50 pieces of river craft in the wreck, including launches, motorboats, steamboats, dredges, dry-docks, pontoons, and other floating equipment. The United States steamboat inspectors estimate this damage at approximately \$100,000. An unestimated number of hogs and cows were drowned, and probably a small number of other livestock.

The total damage of this flood is conservatively estimated at over \$200,000.

Table of flood stages in January 1935

[All dates in January, unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE					
Connecticut:	<i>Feet</i>			<i>Feet</i>	
White River Junction, Vt.....	18	10	10	18.1	10
Hartford, Conn.....	16	11	14	20.7	12
Hudson: Troy, N. Y.....	15	10	11	16.4	10
Chenango: Sherburne, N. Y.....	8	9	11	9.7	9
Susquehanna:					
Oneonta, N. Y.....	12	9	12	16.7	11
Bainbridge, N. Y.....	11	9	12	15.8	11
Binghamton, N. Y.....	14	9	11	16.75	10
Towanda, Pa.....	16	10	11	16.5	10
James:					
Buchanan, Va.....	17	22	24	24.5	23
Lynchburg, Va.....	18	23	24	22.0	23
Columbia, Va.....	10	22	28	30.3	24
Richmond, Va.....	8	23	27	18.8	25
Roanoke:					
Randolph, Va.....	18	24	25	24.8	25
Weldon, N. C.....	31	24	27	38.3	26
Williamston, N. C.....	10	28	Feb. 3	11.4	31
Cape Fear: Lock No. 2, Elizabethtown, N. C.....	20	3	4	23.7	3
Saluda: Pelzer, S. C.....	7	10	11	8.3	10
Santee:					
Rimini, S. C.....	12	{ 2	5	13.0	5
		{ 11	14	12.9	12
		{ 26	27	12.9	27
Ferguson, S. C.....	12	{ 13	17	12.3	14, 15
		{ 3	6	17.8	4
Savannah: Ellenton, S. C.....	14	{ 11	16	20.0	13
EAST GULF OF MEXICO DRAINAGE					
Tombigbee:					
Lock No. 3, Ala.....	33	{ Dec. 29	7	39.2	Dec. 30
		{ 24	30	36.8	26
Lock No. 1, Ala.....	31	{ 1	7	31.4	6
Pearl:					
Jackson, Miss.....	18	{ Dec. 27	12	24.5	2-4
		{ 23	Feb. 2	23.0	26
Monticello, Miss.....	15	{ 23	24	15.3	23
		{ 3	18	13.6	7
Pearl River, La.....	12	{ 26	Feb. 5	13.6	29
MISSISSIPPI SYSTEM					
Upper Mississippi Basin					
Illinois:					
Morris, Ill.....	13	9	10	13.05	9, 10
Peru, Ill.....	17	11	11	17.1	11
Ohio Basin					
Gauley: Summersville, W. Va.....	10	{ 17	18	11.76	17
		{ 21	23	11.46	23
New: Glenlyn, Va.....	11	{ 23	23	11.4	23
Barren: Bowling Green, Ky.....	20	{ 20	25	34.4	23

Table of flood stages in January 1935—Continued

[All dates in January, unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
MISSISSIPPI SYSTEM—continued					
Ohio Basin—Continued					
Green:	Feet			Feet	
Lock No. 6, Brownsville, Ky.....	28	20	27	43.4	23
Lock No. 4, Woodbury, Ky.....	33	20	29	48.1	24
Lock No. 2, Rumsey, Ky.....	34	22	Feb. 5	41.6	30
West Fork: Edwardsport, Ind.....	12	23	24	13.0	24
Cumberland:					
Celina, Tenn.....	28	21	24	36.0	23
Clarksville, Tenn.....	46	21	25	49.7	22
Lock F, Eddyville, Ky.....	50	22	29	55.7	25
North Fork: Mendota, Va.....	8	23	23	10.3	23
Nolichucky: Embreeville, Tenn.....	8	9	9	10.3	9
French Broad:					
Asheville, N. C.....	6	9	11	8.3	9
Oldtown, Tenn.....	8	9	9	9.5	9
Ohio:					
Dam No. 25.....	40	25	25	41.1	25
Dam No. 47, Newburgh, Ind.....	35	28	30	35.3	29
Evansville, Ind.....	35	26	30	35.8	29
Dam No. 50, Fords Ferry, Ky.....	34	24	Feb. 2	36.9	28-30
White Basin					
Black: Black Rock, Ark.....	14	21	28	18.1	21
White: Clarendon, Ark.....	26	29	Feb. 6	26.3	Feb. 3
Arkansas Basin					
Petit Jean: Danville, Ark.....	20	20	24	24.66	22
Red Basin					
Ouachita:					
Arkadelphia, Ark.....	17	20	23	25.62	21
Camden, Ark.....	26	22	31	37.11	25
Little: Whitecliffs, Ark.....	25	22	27	27.9	23
Sulphur:					
Ringo Crossing, Tex.....	20	19	25	27.2	21
Naples, Tex.....	22	22	31	30.0	24
Lower Mississippi Basin					
Big Lake Outlet: Manila, Ark.....	10	3	(1)	16.8	28, 29
St. Francis:					
Fisk, Mo.....	20	20	26	23.4	23
St. Francis, Ark.....	18	21	(1)	21.7	26
Tallahatchie: Swan Lake, Miss.....	26	10	(1)	(1)	(1)

¹ Continued into February.

WEATHER OF THE ATLANTIC AND PACIFIC OCEANS

(The Marine Division, W. F. McDONALD in Charge)

NORTH ATLANTIC OCEAN, JANUARY 1935

By H. C. HUNTER

Atmospheric pressure.—The average pressure during January was greater than normal over most of the North Atlantic, and was especially high, compared with normal, over the northeastern area. At Valencia, Ireland, the month averaged 0.5 inch above normal pressure, or 1.05 inches higher than during the month preceding. A period of particularly high pressure over the waters adjacent to the British Isles was noted from the 15th to 22d.

The southeastern portion of the North Atlantic averaged slightly above normal in pressure, and from the 21st to the end of the month this region was almost constantly much above normal.

One considerable part of the North Atlantic, the southwestern, had pressure averaging moderately less than normal. Bermuda averaged for the month 0.07 inch lower than normal pressure, and was nearly always below during the last 9 days of the month.

The highest reading reported was 30.86 inches, by the American steamship *Collamer* during the forenoon of the 21st, at about latitude 50° N., longitude 12° W. The

lowest reading was 28.45 inches, noted by the Dutch steamer *Leerdam*, very late on the 14th, at about 43° N., 62° W., near the center of a well-developed storm. These pressure extremes were from three to six tenths of an inch higher than those of the preceding month.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, January 1935

Station	Average pressure	Departure	Highest	Date	Lowest	Date
	<i>Inches</i>	<i>Inch</i>	<i>Inches</i>		<i>Inches</i>	
Julianehaab, Greenland.....	29.52		30.15	22, 25	28.93	15
Reykjavik, Iceland.....	29.74	+0.28	30.39	4	28.74	9
Lerwick, Shetland Islands.....	30.01	+0.31	30.80	18	28.52	25
Valencia, Ireland.....	30.40	+0.50	30.83	21	29.84	25
Lisbon, Portugal.....	30.24	+0.09	30.47	12	30.03	19
Madeira.....	30.13	+0.03	30.32	26	29.94	10
Lorta, Azores.....	30.23	+0.07	30.58	30	29.94	18
Belle Isle, Newfoundland.....	29.85	+0.05	30.52	29	28.88	3
Halifax, Nova Scotia.....	30.02	+0.04	30.72	5	28.88	2
Nantucket.....	30.10	+0.06	30.82	5	29.28	1
Hatteras.....	30.16	+0.02	30.62	5	29.61	23
Bermuda.....	30.09	-0.07	30.48	5	29.68	10
Turks Island.....	30.01	-0.04	30.11	20	29.85	10
Key West.....	30.08	-0.02	30.28	30	29.86	9
New Orleans.....	30.17	+0.04	30.53	24	29.78	8

NOTE.—All data based on a. m. observations only, with departures compiled from best available normals related to time of observation, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour corrected means.